Official





camera coordinate transformation between the camera reference coordinate system and the corresponding frame of each of the synchronized video sequences; and

(c) forming the composite video sequence from the synchronized video sequences by transforming each sequence based on the camera coordinate transformation into a chosen focal plane and by superimposing the transformed sequences for merged simultaneous visualization on a single display.

34. The method according to claim 33, wherein the camera coordinate transformation is estimated from the plurality of synchronized video sequences.

35. The method according to claim 33, wherein the camera coordinate transformation is obtained from recorded camera position data and parameters including focal length.

A1

36. The method according to claim 33, wherein for each video sequence a respective foreground object and a background are distinguished, and wherein the transformed foreground objects are superimposed on the transformed background.

37. The method according to claim 36, further comprising the step of extracting the respective foreground object and the background for each of the synchronized video sequences.

38. The method according to claim 37, wherein extracting comprises producing a weight mask sequence, with each weight mask being an array having an entry for each pixel position for differentiating between the respective foreground object and the background.

39. The method according to claim 36, wherein synchronizing is with respect to a timed event in the given sequences.

40. The method according to claim 33, wherein synchronizing is with respect to a common spatial event in the given sequences.

41. The method according to claim 33, wherein synchronizing is with respect to two events in each of the given sequences, with time scaling for equalizing time between the events.

42. The method according to claim 33, wherein the chosen focal plane corresponds to the focal plane of one of the given sequences, and wherein the composite sequence is as viewed from the camera location of the one of the given dequences.

43. The method according to claim 33, wherein forming the composite sequences is on a frame-by-frame basis.

A1

44. The method according to claim 33, wherein forming the composite sequence is based on several frames of at least one of the sequences, for an expanded field of view in the composite sequence as compared with the one of the sequences.

45. The method according to claim 33, wherein the given video sequences are from a sports event.

46. The method according to claim 45, wherein the sports event is a ski race.

47. The method according to claim 46, wherein the sports event is a car race.

48. The method according to claim 33, wherein the given video sequences have biomedical significance.

49. The method according to claim 48, wherein biomedical significance comprises significance as to movement of a limb of a patient.

50. The method according to claim 33, wherein the given video sequences comprise car crash test sequences.

51. The method according to claim 50, wherein the car crash test sequences comprises images of cars being tested.

52. The method according to claim 50, wherein the car crash test sequences comprise images of crash dummies in cars being tested.

53. A system for generating a composite video sequence from a plurality of given video sequences, comprising:

(a) means for synchronizing the given video sequences into a corresponding plurality of synchronized video sequences;

(b) means for choosing a camera reference coordinate system for each frame of each synchronized video sequence and obtaining a camera coordinate transformation between the camera reference coordinate system and the corresponding frame of each of the synchronized video sequences; and

(c) means for forming the composite video sequence from the synchronized video sequences by transforming each sequence based on the camera coordinate transformation into a chosen focal plane and by superimposing the transformed sequences for merged simultaneous visualization on a single display.

54. A method for determining differential time between two contestants at a specified location in a race, comprising:

(a) synchronizing a video sequence of one of the contestants with a video sequence of the other contestant;

(b) choosing a camera reference coordinate system for each frame of each synchronized video sequence and obtaining a camera coordinate transformation between the camera reference coordinate system and the corresponding frame of each of the synchronized video sequences;

(c) forming a composite video sequence from the synchronized video sequences by transforming each sequence

based on the camera coordinate transformation into a chosen focal plane and by superimposing the transformed sequences for merged simultaneous visualization on a single display; and

(d) counting the number of frames between the contestants passing the location in the race.

55. A broadcast service for transmitting a composite video sequence whose generation comprises the steps of:

(a) synchronizing a plurality of given video sequences into a corresponding plurality of synchronized video sequences;

(b) choosing a camera reference coordinate system for each frame of each synchronized video sequence and obtaining a camera coordinate transformation between the camera reference coordinate system and the corresponding frame of each of the synchronized video sequences; and

(c) forming the composite video sequence from the synchronized video sequences by transforming each sequence based on the camera coordinate transformation into a chosen focal plane and by superimposing the transformed sequences for merged simultaneous visualization on a single display.

56. A method for generating a composite video sequence from a given video sequence and a given audio sequence, comprising:

(a) synchronizing the given video sequence and the given audio sequence for synchrony between visual features of the video sequence and audio features of the audio sequence; and

(b) forming the composite sequence from the synchronized sequences, having a video portion corresponding to the given video sequence and an audio portion corresponding to the given audio sequence.

57. A system for generating a composite video sequence from a given video sequence and a given audio sequence, comprising: